SOA4DERTS: a service-oriented UML profile for distributed embedded real-time systems

Abstract :

In order to reduce the development complexities of Distributed Embedded Real-Time Systems (DERTS), new software engineering methods and techniques are always adopted. The use of Service Orientated Computing (SOC) and the Unified Modeling Language (UML) for DERTS development is part of this trend. There exists a number of UML profiles for embedded, real-time and SOC separately. However, a holistic UML profile combining the embedded, real-time and Service-Oriented concepts is still missing. This paper presents a UML profile for Service-Oriented DERTS development by defining the stereotypes, along with the associated meta-model and constraints. The utility of the proposed profile is demonstrated by its application in the design of an autonomous mobile robot. The presented profile can also be used for modeling of a distributed environment where different devices are used such as a smart home or an industrial floor.